

an optical detector for receiving said reflected point source image and for
converting said point source image to corresponding digital signals;

a digital data processor for calculating wave aberrations of the eye, using said
digital signals; and

a surgical device connected to receive the calculated wave aberrations from said
digital data processor for performing surgery of said living eye.

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27. The apparatus of claim 26, wherein the surgical device comprises a laser for
performing refractive surgery of the living eye.

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28. The apparatus of claim 27, wherein the calculated wave aberrations comprise at
least third order aberrations.

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29. The apparatus of claim 27, wherein the calculated wave aberrations comprise at
least fifth order aberrations.

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30. The apparatus of claim 27, wherein the refractive surgery is performed on a
cornea of the living eye.

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31. The apparatus of claim 26, wherein the surgical device comprises a laser for
performing photoablative surgery of said living eye.

⁷~~32~~. The apparatus of claim ⁶~~31~~, wherein the calculated wave aberrations comprise at least third order aberrations.

⁸~~33~~. The apparatus of claim ⁶~~31~~, wherein the calculated wave aberrations comprise at least fifth order aberrations.

⁹~~34~~. The apparatus of claim ⁶~~31~~, wherein the photoablative surgery is performed on at least one of a cornea and a retina of the living eye.

¹⁰~~35~~. The apparatus of claim ¹~~26~~, wherein the surgical device comprises a laser for performing photorefractive keratectomy (PRK).

¹¹~~36~~. The apparatus of claim ¹⁰~~35~~, wherein the calculated wave aberrations comprise at least third order aberrations.

¹²~~37~~. The apparatus of claim ¹⁰~~35~~, wherein the calculated wave aberrations comprise at least fifth order aberrations.

¹³~~38~~. The apparatus of claim ¹~~26~~, wherein the surgery comprises surgery on at least one of a cornea, a lens, a retina, a layer behind the retina and a ciliary body of the living eye.

14 ~~39.~~¹³ The apparatus of claim ~~38~~, wherein the calculated wave aberrations comprise at least third order wave aberrations.

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~~40.~~ The apparatus of claim ~~38~~, wherein the calculated wave aberrations comprise at least fifth order wave aberrations.

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~~41.~~¹ The apparatus of claim ~~26~~, wherein the calculated wave aberrations comprise at least third order wave aberrations.

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~~42.~~¹ The apparatus of claim ~~26~~, wherein the calculated wave aberrations comprise at least fifth order wave aberrations.

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~~43.~~¹ The apparatus of claim ~~26~~, wherein the light source comprises a laser.

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~~44.~~¹ The apparatus of claim ~~26~~, wherein the optical detector comprises a Hartmann-Shack detector.

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~~45.~~ Apparatus for use in producing a lens to correct for aberrations of a living eye, comprising:

a light source for generating a reflected point source image of the retina of said living eye;

an optical detector for receiving said reflected point source image and for
converting said point source image to corresponding digital signals;

a digital data processor for calculating wave aberrations of the eye, using said
digital signals; and

a lens fabricating device connected to receive the calculated wave aberrations
from said digital data processor for fabricating said lens to correct the wave aberrations of the
eye.

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46. The apparatus of claim ²⁰45, wherein the calculated wave aberrations comprise at
least third order wave aberrations.

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47. The apparatus of claim ²⁰45, wherein the calculated wave aberrations comprise at
least fifth order wave aberrations.

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48. The apparatus of claim ²⁰45, wherein the lens fabricating device comprises a device
for fabricating an intraocular lens.

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49. The apparatus of claim ²⁰45, wherein the lens fabricating device comprises a device
for fabricating a contact lens.